

file
11038

PRELIMINARY RESULTS
FROM
1969 MENSURATION REFINEMENT STUDY

MEASUREMENTS LESS THAN 20 FEET

Mean Error = 1.3 ft. - .08 (GD)

Standard deviation of error = .75 ft + .05 (GD)

MEASUREMENTS 20 FT TO 1000 FT*

Mean Error = 0.0 ft.

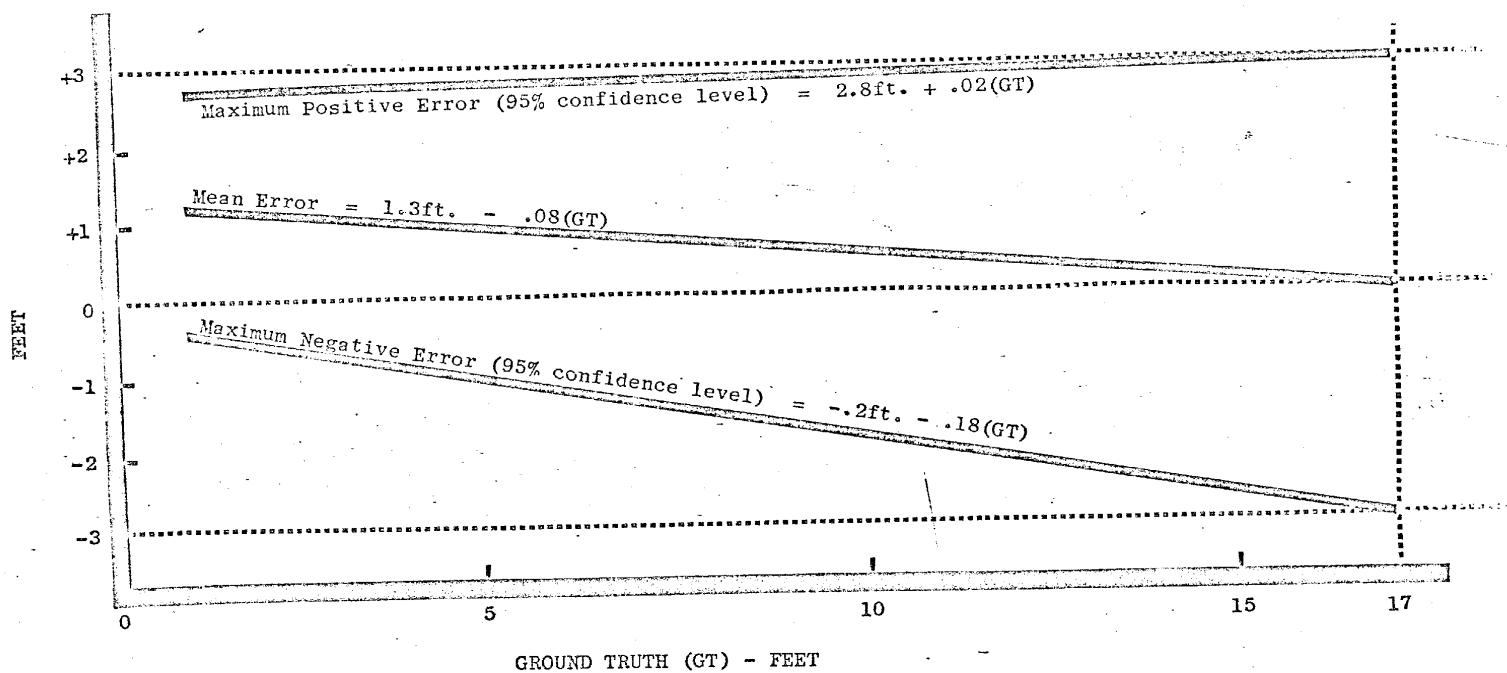
Standard Deviation of error = 1.5 ft + .005 (GD)

GD = Ground Distance

*Data on submarines in the water excluded

Declass Review by
NIMA/DOD

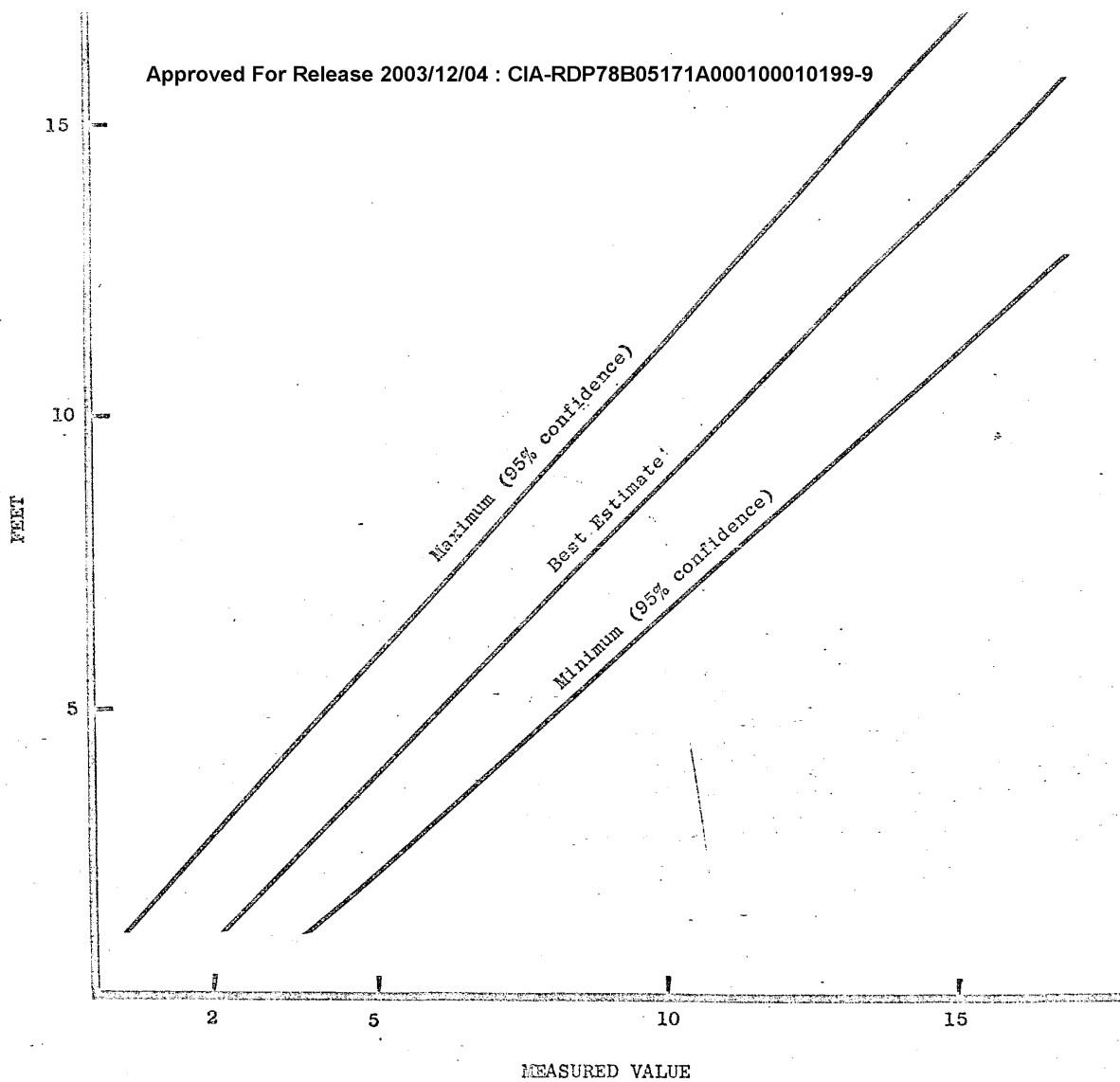
Approved For Release 2003/12/04 : CIA-RDP78B05171A000100010199-9



Measurement Error As A Function Of Ground Truth For Horizontal Dimensions Less Than 20 Feet.

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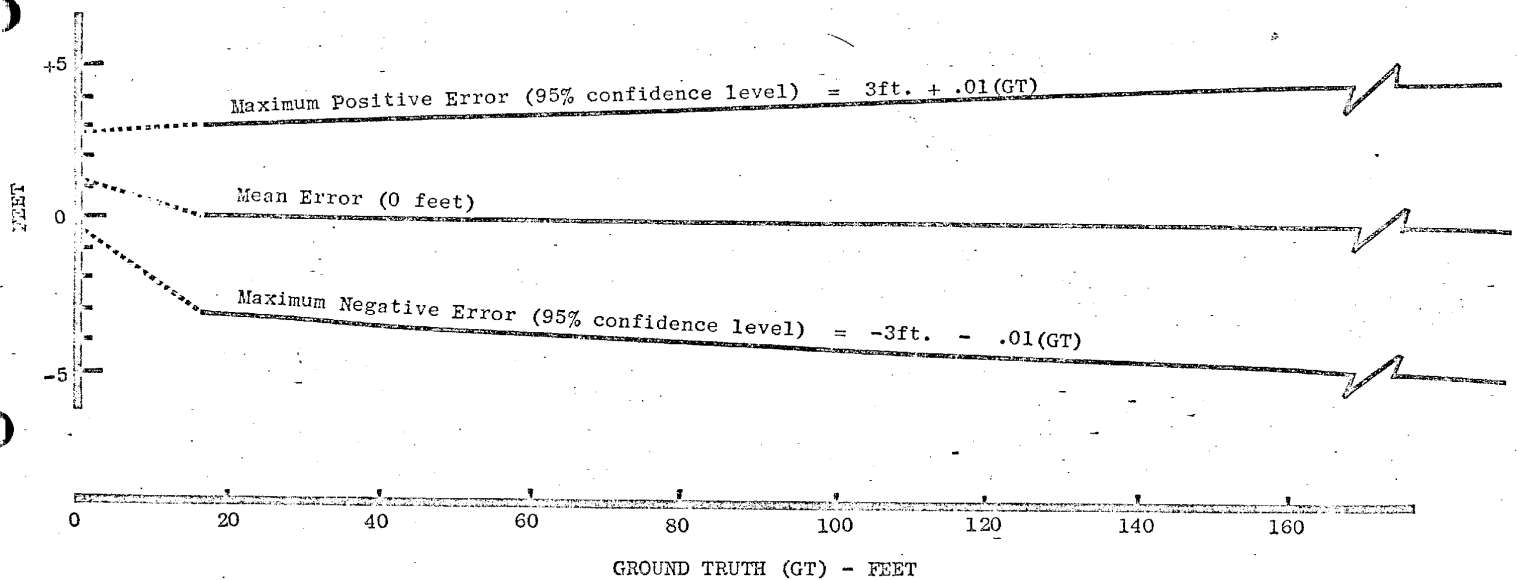
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Ninty-Five Percent Confidence Range For Horizontal Measurements Less Than 20 Feet
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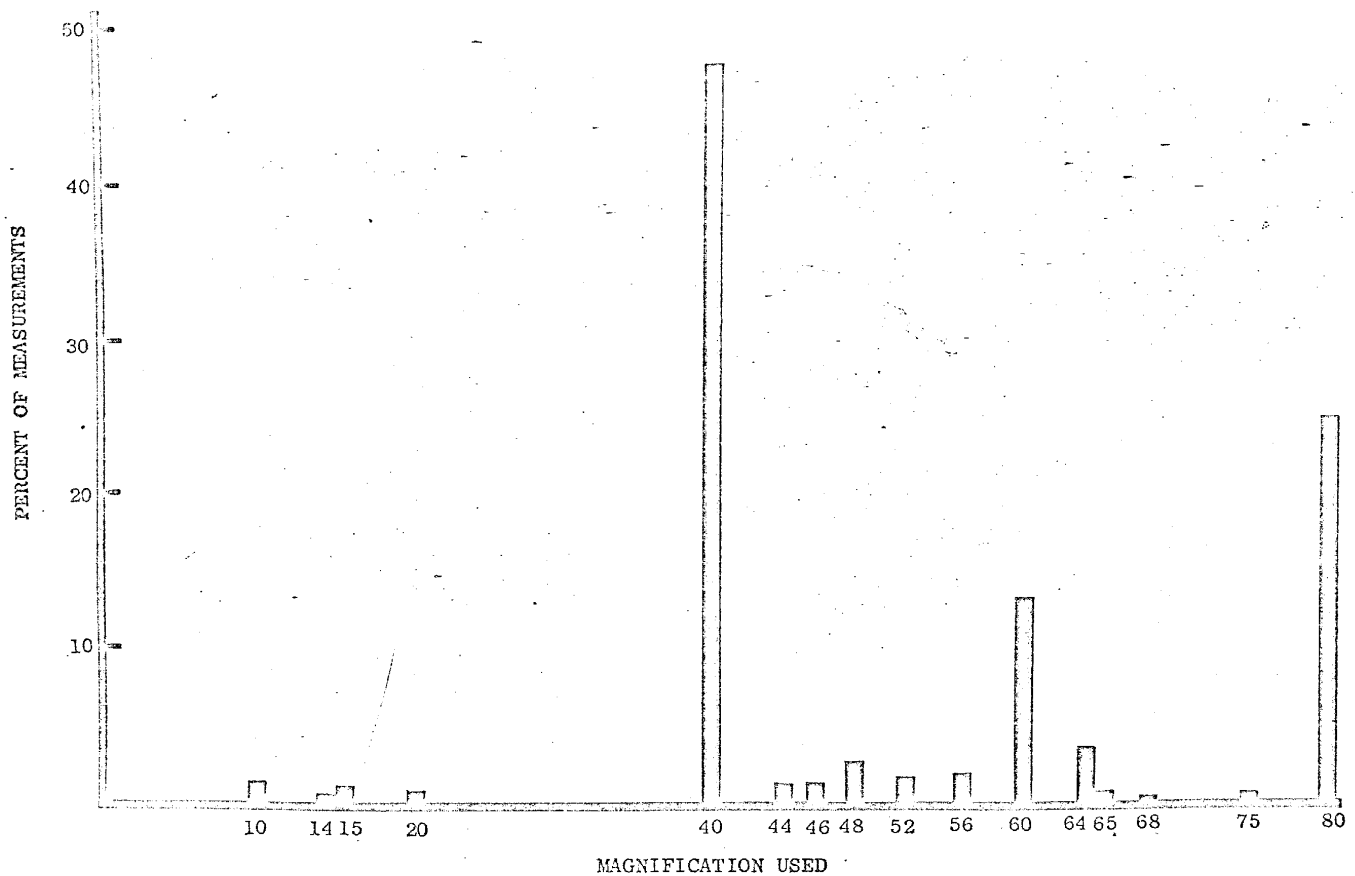
NINETY-FIVE PERCENT CONFIDENCE STATEMENT
FOR HORIZONTAL MEASUREMENTS LESS THAN 20 FT.

MEASURED VALUE (FT)	95% CONFIDENCE STATEMENT (FT)
1	< 1.5
2	< 2.6
3	< 3.8
4	3 ± 1.9
5	4.1 ± 2.0
6	5.2 ± 2.1
7	6.3 ± 2.2
8	7.3 ± 2.3
9	8.4 ± 2.4
10	9.5 ± 2.5
11	10.6 ± 2.6
12	11.7 ± 2.7
13	12.7 ± 2.8
14	13.8 ± 2.9
15	14.9 ± 3.0
16	16.0 ± 3.1
17	17.0 ± 3.2



Measurement Error As A Function Of Ground Truth For Horizontal Dimensions
Greater Than 20 Feet And Less Than 1,000 Feet

Magnification Used By Photogrammetrists When Making Horizontal Measurements Of
 Less Than 1,000 Feet
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LINEAR CORRELATION COEFFICIENTS
FOR HORIZONTAL MEASUREMENTS LESS THAN 20 FEET

	MEAN ERROR	STANDARD DEVIATION OF ERROR	MEAN ABSOLUTE ERROR
Image Length	-.70	.35	-.07
Ground Truth	-.71	.39	-.05
Along Track Position	.22	.23	.28
Across Track Position	.19	.29	.28
Across Track Orientation	.31	.07	.10
Along Track Scale	.17	.28	.25
Across Track Scale	.18	.28	.30
Roll	.11	.21	.11
Pitch	-.07	-.11	-.11
Image Quality	-.003	.03	-.03
Accuracy Estimate	-.60	.35	.07
Time	.20	.43	.25
Magnification	.22	.15	.26

LINEAR CORRELATION COEFFICIENTS
FOR HORIZONTAL MEASUREMENTS BETWEEN 20' and 1000'

	MEAN ERROR	STANDARD DEVIATION OF ERROR	MEAN ABSOLUTE ERROR
Image Length	-.03	.48	.54
Ground Truth	-.07	.46	.52
Along Track Position	-.21	-.14	-.13
Across Track Position	-.15	-.07	-.04
Across Track Orientation	-.13	-.09	-.10
Along Track Scale	-.14	-.12	-.14
Across Track Scale	-.20	-.10	-.11
Roll	-.07	.05	.19
Pitch	.08	.04	.04
Image Quality	.12	.02	-.002
Accuracy Estimate	-.01	.53	.64
Time	-.08	-.09	-.01
Magnification	-.22	-.30	-.31

CORRELATION BETWEEN IMAGE QUALITY*
AND
ERRORS FOR MEASUREMENTS LESS THAN 10'

Data is given for those frames which had 6 measurements under 10'.

FRAME #	IMAGE QUALITY*	MEAN ERROR	STANDARD DEVIATION OF ERROR	MEAN ABSOLUTE ERROR
16	20	1.59	3.35	1.68
7	21	0.77	0.75	0.85
17	22	1.42	1.36	1.53
8	23	1.07	0.72	1.09
1	23	1.23	0.92	1.28
2	25	1.30	1.43	1.44
18	26	1.09	0.97	1.11
15	30	0.91	0.73	0.91
Correlation =		-.42**	-.49**	-.47**

* Image Quality expressed in inches for entire frame.

** Not statistically significant.

MAGNIFICATIONS USED BY PHOTOGRAMMETRISTS
ON 1210 FOR HORIZONTAL DIMENSIONS

SUBJECT	MEASUREMENT DATA USED			
	<10'	200'-300'	All < 1000'	All > 1000'
1	40	40	40	40
2	40	40	40	40
3	79	79	79	52
4	56	52	54	49
5	50	40	42	40
6	49	51	50	52
7	40	32	36	26
8	62	52	52	40
9	75	57	62	51
10	80	80	80	80
11	64	67	68	67
12	42	42	43	40
Mean	56	53	54	48

MAGNIFICATIONS USED ON SCC BY PHOTOGRAMMETRISTS

SUBJECT	MAGNIFICATIONS	MAGNIFICATIONS	NO. OF TIMES USED
1	40	30	77
2	58	39	12
3	98	42	20
4	61	60	384
5	61	66	3
6	60	75	3
7	46	76	1
8	49	78	20
9	84	84	3
10	76	90	37
11	75	100	12
12	61	120	45
		150	7
Mean	64		

MAGNIFICATION AS A FUNCTION
OF VIEWING MODE

Mono - 61 (288)

Stereo - 67 (336)

MAGNIFICATIONS USED BY PHOTOINTERPRETERS ON SCC
FOR HORIZONTAL MEASUREMENTS

SUBJECT	MAGNIFICATIONS	MAGNIFICATIONS	NO OF TIMES USED
13	30	30	164
14	48	60	456
15	60	100	3
16	60		
17	59		
18	54		
19	58		
20	59		
21	31		
22	60		
23	49		
24	61		
Mean	52		

MAGNIFICATION AS A FUNCTION
OF VIEWING MODE

Mono - 51 (136)
Stereo - 53 (488)

MAGNIFICATION USED FOR HEIGHT MEASUREMENTS

BY PHOTOGRAMMETRISTS ON 1210

STAT

SUBJECT	MAGNIFICATIONS	MAGNIFICATIONS	NO. OF TIMES USED
1	41	10	3
2	40	14	1
3	80	15	1
4	52	40	165
5	42	44	3
6	52	46	3
7	40	48	5
8	52	52	9
9	67	56	4
10	80	60	39
11	71	64	16
12	41	80	98
Mean	55		

MEASUREMENT TYPE	MAGNIFICATION	NO. OF TIMES USED
Q	55	174
Z	55	165
Shad	54	8